RINGKASAN

Lactobacillus plantarum AKK-30 merupakan Bakteri Asam Laktat (BAL) milik BPTBA LIPI Yogyakarta yang diisolasi dari kolon ayam kampung. *L. plantarum* AKK-30 memiliki kemampuan mereduksi kolesterol pada unggas dan diindikasikan mampu menghasilkan senyawa antimikroba yang dapat menghambat pertumbuhan bakteri patogen pada saluran pencernaan unggas. Frukto Oligosakarida (FOS) merupakan jenis gula kompleks dan dapat digunakan sebagai media tumbuh Bakteri Asam Laktat (BAL). FOS diharapkan dapat meningkatkan pertumbuhan *L. plantarum* AKK-30, sehingga menyebabkan korelasi terhadap peningkatan aktivitas antimikroba yang dihasilkan. Tujuan penelitian ini adalah mencari interaksi antara konsentrasi FOS dan waktu inkubasi terbaik untuk pertumbuhan *L. plantarum* AKK-30, serta mengetahui kemampuan ekstrak metabolit antimikroba *L. plantarum* AKK-30 terhadap bakteri patogen yang diujicobakan

Penelitian menggunakan metode eksperimental dengan dua tahap. Tahap pertama adalah mencari pertumbuhan terbaik *L. plantarum* AKK-30 secara Rancangan Acak Lengkap (RAL) pola faktorial dengan faktor pertama perlakuan konsentrasi Frukto Oligosakarida (FOS) yang berbeda, yaitu konsentrasi 0%, 0,5%, 1%, dan 1,5%. Faktor kedua adalah inkubasi pada waktu berbeda yaitu 6, 12, 18, dan 24 jam. Masing-masing perlakuan diulang sebanyak 3 kali, sehingga didapat 48 unit percobaan. Tahap kedua adalah menguji aktivitas ekstrak metabolit antimikroba *L. plantarum* AKK-30 hasil dari tahap pertama secara Rancangan Acak Lengkap (RAL) yang diujicobakan pada 4 jenis bakteri patogen yaitu *Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus,* dan *Salmonella pullorum*. Masing-masing perlakuan diulang sebanyak 6 kali. Data dianalisis secara statistik menggunakan analisis ragam (ANOVA) pada tingkat kepercayaan 95% dengan instrument CoSTAT. Hasil uji ANOVA yang berbeda nyata dilanjutkan dengan uji Duncan.

Hasil penelitian menunjukkan bahwa konsentrasi FOS 1 % dengan waktu inkubasi 24 jam menghasilkan pertumbuhan terbaik untuk *Lactobacillus plantarum* AKK-30 sebesar $2{,}11 \times 10^8$ CFU's/ml pada nilai *Total Plate Count* (TPC). Ekstrak metabolit antimikroba *Lactobacillus plantarum* AKK-30 mampu menghambat pertumbuhan bakteri *Escherichia coli* 9,9 mm, *Pseudomonas aeruginosa* 8,78 mm, *Staphylococcus aureus* 10.8 mm, dan *Salmonella pullorum* 9,08 mm. Dapat disimpulkan bahwa konsentrasi FOS 1% dapat meningkatkan pertumbuhan *L. plantarum* AKK-30 dan mempunyai efek antibakteri.

Kata kunci: *Lactobacillus plantarum* AKK-30, Frukto Oligosakarida, Pertumbuhan, Antimikroba.

SUMMARY

Lactobacillus plantarum AKK-30 is a Lactic Acid Bacteria (LAB) from BPTBA LIPI Yogyakarta isolated from the large intestine of native chickens. *L. plantarum* AKK-30 has the ability to reduce cholesterol in chickens and is indicated to be able to produce antimicrobial compounds that can inhibitted the growth of pathogenic bacteria in the digestive tract. Fructo Oligosaccharide (FOS) is a type of complex sugar and can be used as a growth medium for Lactic Acid Bacteria (LAB). FOS was expected to increase the growth of *L. plantarum* AKK-30, thus causing a correlation with the increase in antimicrobial activity produced. The purpose of this study was to find interactions between FOS concentration and the best incubation time for the growth of *L. plantarum* AKK-30, and determine the ability of antimicrobial metabolite extract of *L. plantarum* AKK-30 against pathogenic bacteria tested.

This study used an experimental method with two stages. The first step was to find the best growth of *L. plantarum* AKK-30 in a factorial complete randomized factorial pattern (CRD) with the first factor of treatment were concentrations of Fructo Oligosaccharide (FOS) 0%, 0,5%, 1%, and 1,5%. The second factor was incubation at different times which were 6, 12, 18, and 24 hours. Each treatment was repeated 3 times, so there were 48 experimental units. The second stage was to test the activity of antimicrobial metabolite extract of *L. plantarum* AKK-30 from the first stage in a completely randomized design (CRD) which was tested on 4 types of pathogenic bacteria are *Escherichia coli*, *Pseudomonas aeruginosa, Staphylococcus aureus*, and *Salmonella pullorum*. Each treatment was repeated 6 times. Data were analyzed statistically using variance analysis (ANOVA) at a 95% confidence level with the CoSTAT instrument. The results of the ANOVA test were significantly different tested by the Duncan test.

The results of the study were 1% FOS concentration with 24-hour incubation time resulted in the best growth of *L. plantarum* AKK-30 was 2,11 x 10^8 CFU's/ml in the Total Plate Count (TPC) value. Antimicrobial extract of *Lactobacillus plantarum* AKK-30 was able to inhibit the growth of *Escherichia coli* was 9,9 mm, *Pseudomonas aeruginosa* was 8,78 mm, *Staphylococcus aureus* was 10,8 mm, and *Salmonella pullorum* was 9,08 mm. It can be concluded that the concentration of 1% FOS can increase the growth of *L. plantarum* AKK-30 and have an antibacterial effect.

Keywords: *Fructo Oligosakarida*, *Lactobacillus plantarum* AKK-30, *Growth*, *Antimicroba*.